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Factors Influencing the Prognosis of Wheezy Infants

Kyoichiro Toyoshima, M.D.,* Michiaki Hayashida, M.D.,*
Jun Yasunami, M.D.,* Isamu Takamatsu, M.D.,*
Hisao Niwa, M.D.,* and Tetsuji Muraoka, M.D.†

*Department of Pediatric Allergy
Osaka Prefectural Habikino Hospital
3-7-1, Habikino
Habikino City
Osaka 583, Japan
†Muraoka Pediatric Clinics
Fujiidera, Osaka, Japan

ABSTRACT

Forty-eight wheezy infants were followed up for 25 to 44 months. These infants were classified into three groups: those with asthma (developed asthma later), the wheezy group (had successive wheezing episodes), and the nonwheezy group (grew out of the wheezy episodes).

Serum IgE levels at the first visit were not significantly different in the three groups, but the frequency of exposure to cigarette smoke was higher in the asthma and wheezy groups than in the nonwheezy group.

INTRODUCTION

Most wheezy infants grow out of wheezing episodes in childhood. But some wheezy infants will have recurrent wheezing attacks in childhood or become asthmatics.

It is important for clinicians to anticipate the prognosis of the wheezy infants, if possible. We followed up the wheezy infants for a couple of years, and we were aware of the fact that passive smoking worsens the prognosis of wheezy infants.

MATERIALS AND METHODS

We selected 65 nonfebrile wheezy infants less than 3 years old who had no dyspnea

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typical of asthma. The questionnaire (Figure 1) was filled out by the doctors during the interview with the mothers. At the first visit, venous blood was drawn for hematology and determination of serum IgE. The state of wheezing was reevaluated 25 to 44 months later by examining the medical chart or by telephoning the mothers. Reliable information was obtained in 48 cases (33 boys, 15 girls).

Serum IgE levels were assayed by the ELISA method with the Phadezyme Kit (Pharmacia). Serum IgE levels were compared with the old matched mean value for healthy infants by Furukawa et al. (1), and the level was judged as high when the level was a standard deviation higher than the mean value, and extremely high when the level was two standard deviations higher than the mean value.

The infants who had more than 5% peripheral blood eosinophils were diagnosed as eosinophilic.

Comparability of the groups was evaluated by the chi square test, Fischer's exact test, or Student's t test.

RESULTS

The mean age at the first visit was 14.9 ± 8.6 months (mean ± SD). The infants were

Name Sex M. F. Birthday_____

Date Age

IgE (ELISA): IU/ml

Hematology WBC: Eo: %

1. Major allergy in relatives: + − (Atopic dermatitis / Asthma, rhinitis / Recurrent urticaria)
2. Minor allergy in relatives: + − (Urticaria / Adverse drug reaction)
3. Past history of wheezing: + − Initial age: Season:
4. Allergic past history
   Eczema: + −, Allergic rhinitis: + −, Recurrent urticaria: + −
5. Past history of food allergy: + −
6. Fever with wheezing: + −
7. Birth weight: g
8. Disturbances at birth: + − ( )
9. Start of formula milk: month(s)
10. Start of fruit juice: months
11. Feeding method: breast formula
12. Vaccination history:
13. Symptoms at first visit: Wheezing (+ −), Fever (+ −)
14. Smoking habits in family: Father (++ + −), Mother (++ + −), Others (++ + −)

Figure 1. Questionnaire completed in interviews with the mothers of the wheezy infants.

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classified into three groups: The first (the asthma group) included 12 wheezy infants who were diagnosed later as asthmatic. The second group (wheezy) comprised nine wheezy infants who still had wheezing episodes in the last year of the observation period. The third group (nonwheezy) included 27 infants who had no wheezing episodes in the last year of the observation period. The infants' mean age did not differ significantly between the groups (Table 1).

The findings in each group are summarized in Table 2. The statistical differences between the groups were calculated. Hyperglobulinemia E levels, family history of allergy, history of wheezing and of allergic diseases, disturbances at birth, breast feeding, and fever episodes with wheezing were not different statistically between the groups. Eosinophilia was more frequent in the asthma group than in the other groups. Infants in the asthma and wheezy groups lived with family members who smoked heavily. The mean age when the initial wheezing episode occurred was greater in the asthma group than in the other groups.

Table 1. Mean Age of Each Group

GROUP	INFANTS	MEAN AGE (mo)
Asthma	12	18.3 ± 9.4
Wheezy	9	14.0 ± 7.1
Nonwheezy	27	13.7 ± 8.5

DISCUSSION

Some investigators have reported that IgE levels in cord blood or in infants predict the development of atopic diseases in later life (2–4). Our findings show that IgE levels in wheezy infants do not predict the development of asthma or continuation of wheezing episodes. On the other hand, eosinophilia was more frequent in the asthma group than in the other groups. Considering these two findings, asthma may develop through a non-IgE-mediated allergic process. But this cannot be concluded only by our findings.

Table 2. Clinical Features of Each Group

	HIGH IgE	EXTREMELY HIGH IgE	EOSINOPHILIA	FAMILY HISTORY	HISTORY OF WHEEZING	HISTORY OF ALLERGIC DISEASES
1. Asthma group	5/11	1/11	6/11	8/12	9/12	7/12
2. Wheezy group	4/8	2/8	0/7	6/9	8/9	4/9
3. Nonwheezy group	6/26	4/26	2/24	12/27	20/27	10/27
Differences						
(1+2)/3	NS	NS	$p = 0.05$	NS	NS	NS
1/2			$p = 0.025$			
1/3			$p = 0.006$			

	DISTURBANCE AT BIRTH	FORMULA MILK < 1 mo OLD	SMOKING IN FAMILY	FEVER WITH WHEEZING	AGE OF INITIAL WHEEZING (mo)
1. Asthma group	1/12	6/11	9/10	2/11	14.5 ± 8.7
2. Wheezy group	2/9	3/9	8/8	1/9	9.0 ± 6.0
3. Nonwheezy group	3/27	13/26	13/22	5/26	8.1 ± 8.1
Differences					
(1+2)/3	NS	NS	$p = 0.01$	NS	
1/2					$p \leq 0.1$
1/3					$p < 0.05$

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The fact that parental smoking affects childhood airway diseases has been reported by others (5,6). But it is not clear whether parental smoking increases the morbidity of infantile asthma. Our findings showed that the infants in smokers' families had successive wheezing episodes or developed asthma more frequently. Accordingly, we can conclude that passive smoking inhibits the outgrowing of wheezing in infants. We could not identify the mechanism by which passive smoking affected the infantile airways, but we should advise the families whose infants have wheezing episodes to stop smoking.

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